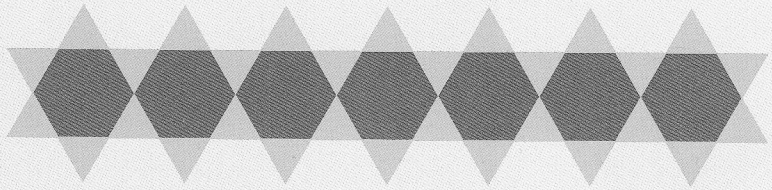
Pattern Predictions

You need ☑ sticks ☑ pattern blocks (optional)

Activity

1. a. i. How many hexagons are in this pattern?

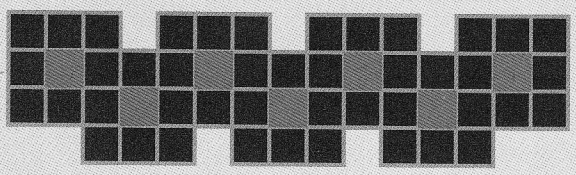
   ii. How many green triangles are in this pattern?



   b. If you used 16 hexagons to make a pattern like this, how many green triangles would you use?

   c. Sonny uses 82 green triangles.
   How many hexagons will he need to make this pattern?

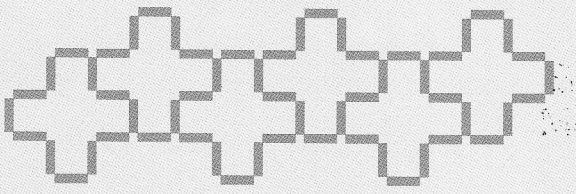
2. a. How many orange squares and purple squares are in this pattern?



   b. If you continued this pattern, how many purple squares would be needed for 12 orange squares?

   c. What rule did you use to work out your answer?

3. a. How many sticks make up the six crosses in this pattern?



   b. How many sticks would you need to make 10 crosses?

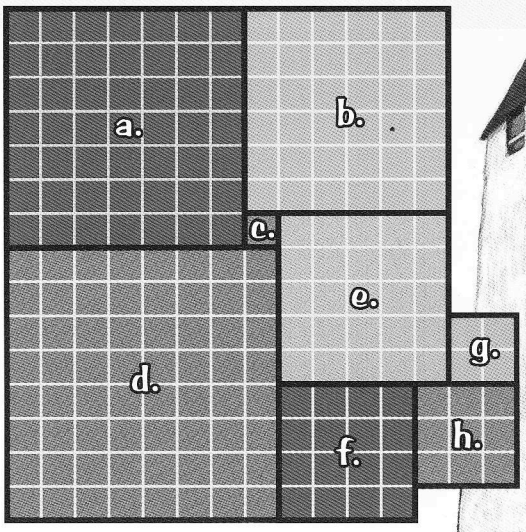
   c. If you had 120 sticks, how many crosses could you make?

All Square

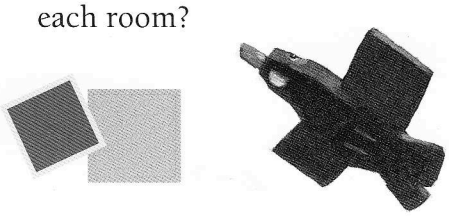
You need ☑ a classmate

Activity One

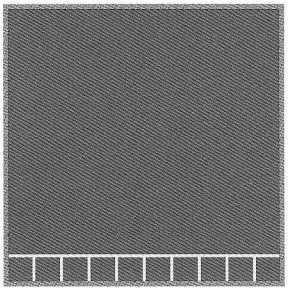
The floor of every room in the Shape family's house is a square.
The lines show the edges of the tiles used to cover the floor.

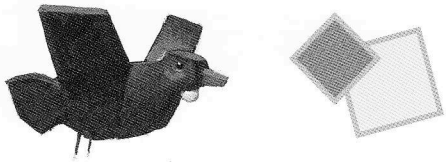


1. How many tiles are on the floor of each room?



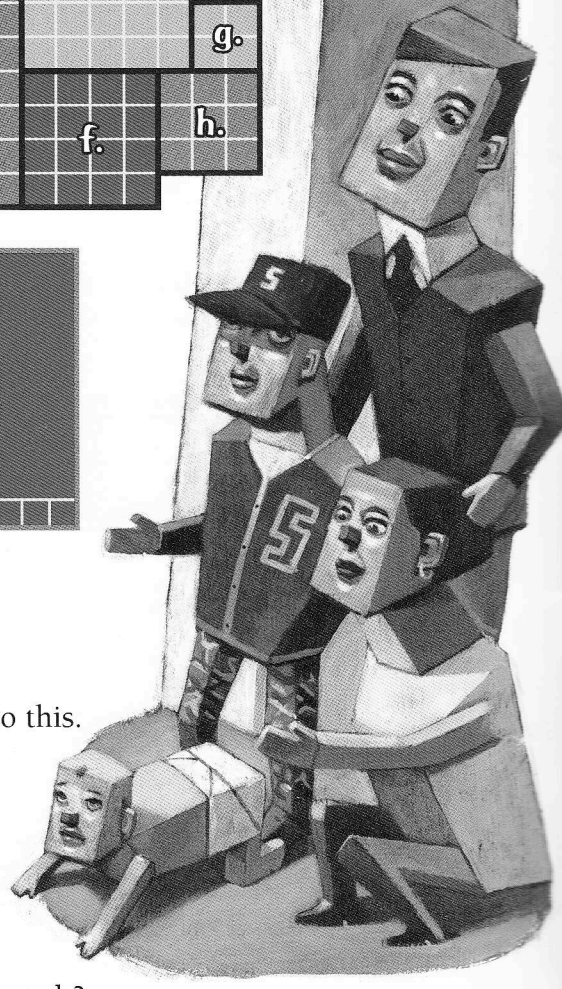
2. How many tiles would be on the floor of a square room that is 10 tiles wide?





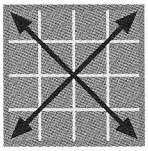
3. a. If you were tiling just rooms a–f, how many tiles would you need?

   b. What strategy did you use to work this out? Discuss with a classmate if there is an easy way to do this.



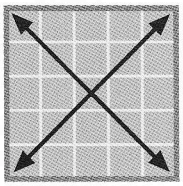
Activity Two

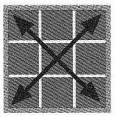
In this square room, the diagonals pass through eight tiles.

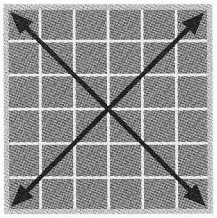


1. How many tiles do the diagonals of these rooms pass through? (Do not count the same tile twice.)

   a. 

   b. 

   c. 

   d. 

2. If a square room is nine tiles wide, how many tiles will its diagonals pass through?

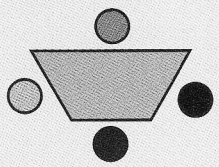
3. Can you find a rule for working out the number of tiles cut by the diagonals?

Where to Sit?

You need ☑ pattern blocks and counters (optional) ☑ a classmate

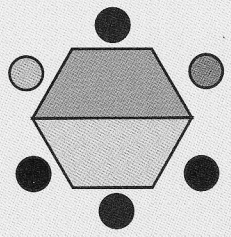
Activity

Trapezium-shaped desks can be arranged in many ways.



One person can sit on each side of a single desk.

Six people can sit around two desks joined in this way.

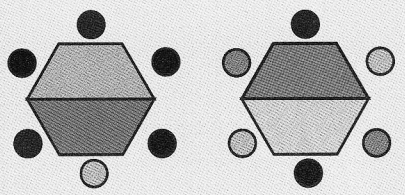


Room 8 want to change the way their desks are arranged. They have 20 desks and can get as many chairs as they need.

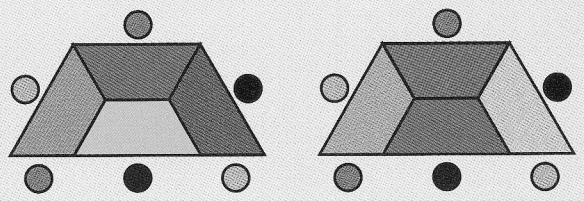
Their teacher challenges them to use rules to work out how many people can be seated if all the desks are arranged in the same way.

First they look at these two arrangements:

a.

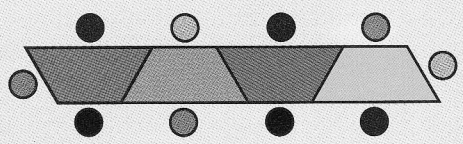


b.

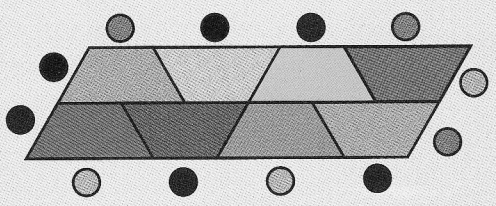


Then they look at arrangements where all 20 desks can be joined together:

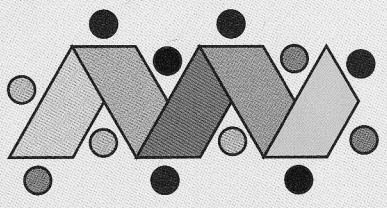
c.



d.



e.



1. How many people can be seated if all 20 desks are arranged in each of the five ways above?
2. Discuss with a classmate the rules you used to work out your answer.
3. Work with your classmate to make up some other seating patterns for 20 trapezium-shaped desks.
   How many people can be seated in each pattern?

Animal Antics

You need ☑ counters

Activity One

The pattern of triangular numbers is:

The pattern can be shown in this table:

Bottom row of counters	1	2	3	4	5	...	10
Total number of counters	1	3	6	10	15	...	?

1. Use the table to predict the tenth triangular number.
Build the pattern with counters to check your prediction.

2. The bottom row of the table shows these differences:

1 3 6 10 15 . . .

+ 2 + 3 + 4 + 5

Explain why these differences occur.

Activity Two

Five animals want to race across the river in as few jumps as possible without getting wet. Each animal can only use stones that match their number label. The labels are: odd (Dog), even (Cat), triangular (Rabbit), square (Frog), and multiples of three (Weka).

They can jump only from one adjacent stone to another, in any direction.

Which animal takes the most jumps to get across?